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Vacuum-ultraviolet interconfigurational 4f3 → 4f 25d absorption and emission studies of the Nd3+ ion in KYF, YF, and YLF crystal hosts

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Abstract

The laser-induced vacuum-ultraviolet fluorescence spectra of KY 3F10:Nd3+ (KYF:Nd) and YF3:Nd 3+ (YF:Nd) single crystals pumped by a pulsed-discharge molecular F2 laser at 157 nm were obtained. A number of new fluorescence peaks were observed and were assigned to the 4f 25d → 4f3 dipole-allowed transitions of the Nd3+ ion. The absorption spectra of LiYF4:Nd3+ (YLF:Nd), KYF:Nd, and YF:Nd crystal samples in the vacuumultraviolet spectral regions were also obtained. Finally, the splitting of the states of the 4f25d configuration of the Nd 3+ ion, which is due to the crystal field, was observed in all the crystal samples.

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